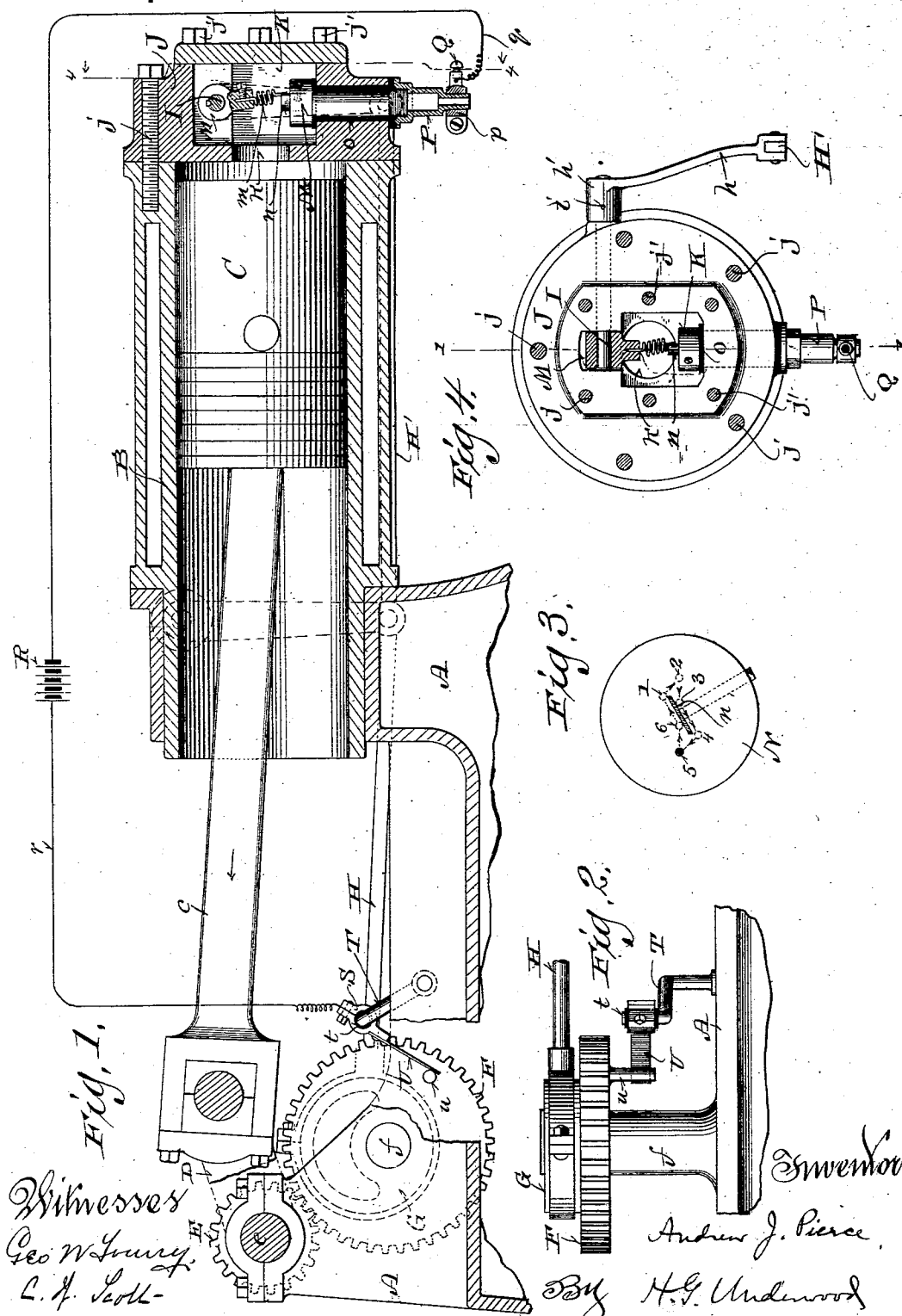


(No Model.)

A. J. PIERCE.
IGNITING DEVICE FOR GAS ENGINES.

No. 564,642.

Patented July 28, 1896.



Witnesses
Geo W. Young
C. H. Cook-

Inventor
Andrew J. Pierce.
By H. G. Underwood
Attorney

UNITED STATES PATENT OFFICE.

ANDREW J. PIERCE, OF RACINE, WISCONSIN.

IGNITING DEVICE FOR GAS-ENGINES.

SPECIFICATION forming part of Letters Patent No. 564,642, dated July 28, 1896.

Application filed May 27, 1893. Serial No. 475,762. (No model.)

To all whom it may concern:

Be it known that I, ANDREW J. PIERCE, a citizen of the United States, and a resident of Racine, in the county of Racine, and in the State of Wisconsin, have invented certain new and useful Improvements in Igniting Devices for Gas-Engines; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to gas-engines; and it consists in certain novel means for economically igniting the gas by an electric spark, as will be fully set forth hereinafter and subsequently claimed.

In the drawings, Figure 1 is a representation, chiefly in vertical longitudinal central section on the line 1 1 of Fig. 4, of so much of a gas-engine as is necessary to illustrate my present invention. Fig. 2 is a detail view of portions of the foregoing. Fig. 3 is a diagrammatic view, and Fig. 4 is a vertical sectional view on the line 4 4 of Fig. 1.

A represents a portion of the frame of the engine, and B is the cylinder.

C is the piston, and *c* the piston-rod, the latter being connected by link D with the shaft *e* of a pinion E, which meshes with a gear-wheel F, supported on a stud *f* on the frame A, said gear F carrying an eccentric G, whose strap *g* is secured to one end of a jointed rod H H', the other end of said rod being pivoted to one end of a crank *h*. The other end of this crank *h* is formed with a sleeve *h'*, secured rigidly, as by a pin *i*, to a shaft I, journaled in a head J, which is secured, as by screws *j, j'*, to the end of the cylinder B. This head J has a chamber K therein, with an opening *k* communicating with the said cylinder, said chamber being covered by a suitable plate L, held to the head J by screws *j', j'*. The upper part of this chamber K receives a block M, fast on the inner end of the described shaft I, which carries an electrode *m*, preferably in the form of a spirally-coiled wire having a downturned point for contact with the other electrode *n*, which latter is preferably a metallic plate, set obliquely in the head of a metallic cylindrical plug N, supported and passing through the said head J, but insulated therefrom, as shown at *o*. The lower projecting end of this plug N is screw-threaded to receive a screw-threaded sleeve P, also insu-

lated from the head J, as shown, the lower end of said sleeve being reduced and fitted with a clip *p*, having a hole in which is inserted one end of a circuit-wire *q*, held tightly in place by a screw Q, running from a battery R. From this battery the other circuit-wire *r* runs to a clip S, secured to an arm T, projecting from the frame A, there being suitable insulation, as shown at *t*, between said arm and clip, and the latter being provided with a metallic brush U, for contact at the proper time with a pin *u*, projecting from the gear-wheel F.

The object of my device is to produce only a single spark in the chamber K while the movable electrode *m* traverses entirely around the stationary electrode *n*, as hereinafter described and illustrated diagrammatically in Fig. 3, and thereby insure economy in the use of the battery.

The chamber K is filled with the mixed gas and air common to gas-engines, and in Fig. 1 the piston is shown just starting on its back stroke with the contact-point of the electrode *m* just leaving one end of the electrode *n*, as shown at 1 in Fig. 3, and with the brush U in contact with the pin *u* on the gear-wheel F, thus completing the circuit, and as the rod H is moved forward by reason of the movement of the eccentric G on said gear-wheel F said rod moves the crank *h*, and this turns the block M on the shaft I, fast to the other end of said crank and carries the point of the electrode *m* to the point 2 in Fig. 3, breaking the contact with the electrode *n* and producing the spark necessary to ignite and explode the gas and air in the chamber K. The pin *u* is now free from contact with the brush U, and as the gear-wheel F continues to revolve the eccentric G brings the rod and crank back, thereby, in an obvious manner, causing the point of electrode *m* to strike against and travel along one side of the electrode *n*, as shown at 3 4 in Fig. 3, but when said electrode-point leaves this end of the electrode *n* and passes to the point 5 there is no spark, because the brush and pin are not yet in contact, and the circuit is therefore open, which open condition continues as said electrode-point moves along to the points 6 and 1 in Fig. 3, on the return forward movement of the eccentric rod and crank, again producing

a spark as the point of electrode *m* passes from the point 1 to the point 2 in Fig. 3, with the brush *U* and pin *u* again in contact, and so on, the piston making two full reciprocations to each full revolution of the gear-wheel *F*.

By the described construction and arrangement great economy is effected, as the battery will last twice as long as would be the case if a spark was produced each time the electrode *m* left the electrode *n*.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

In a gas-engine, the combination with a cylinder having an igniting-chamber thereon

and a piston in the cylinder, of a flexible electrode and a rigid electrode in the chamber, the latter consisting of a rigid flat metallic plate arranged in line with and obliquely to the flexible electrode, consisting of a coiled spring and means for moving the flexible electrode; substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand, at Milwaukee, in the county of Milwaukee and State of Wisconsin, in the presence of two witnesses.

ANDREW J. PIERCE.

Witnesses:

H. G. UNDERWOOD,
C. W. SCOTT.